

CLAIMS

1. A stacked multichip package, comprising:
a base carrier having a top side and a bottom side;
a bottom integrated circuit die having a bottom surface attached to the base carrier top side, and an opposing, top surface, the top surface having a peripheral area including a plurality of first bonding pads and a central area;

a bead formed on the top surface of the bottom die between the peripheral area and the central area; and

a top integrated circuit die having a bottom surface, wherein the top die is positioned over the bottom die and the bottom surface of the top die is attached to the top surface of the bottom die via the bead, wherein the bead maintains a predetermined spacing between the bottom die and the top die.

2. The stacked multichip package of claim 1, wherein the bottom die is attached to the base carrier with a first adhesive material layer.

3. The stacked multichip package of claim 1, wherein the top die and the bottom die are of similar size and shape.

4. The stacked multichip package of claim 1, wherein the top die is larger than the bottom die.

5. The stacked multichip package of claim 1, wherein the bead comprises epoxy.

6. The stacked multichip package of claim 1, further comprising an adhesive material formed in the

central area on the top surface of the bottom die, the adhesive material being surrounded by the bead, wherein the adhesive material secures the top die to the bottom die.

7. The stacked multichip package of claim 6, wherein the bead comprise epoxy.

8. The stacked multichip package of claim 7, wherein the adhesive material comprises epoxy.

9. The stacked multichip package of claim 6, wherein the bottom die is electrically connected to the base carrier with first wires, the first wires having first ends electrically connected to the first bonding pads and second ends electrically connected to first leads on the top side of the base carrier.

10. The stacked multichip package of claim 9, wherein the top die includes a plurality of second bonding pads located in a peripheral area on a top surface of the top die and wherein the top die is electrically connected to the base carrier with second wires, the second wires having first ends electrically connected to the second bonding pads and second ends electrically connected to second leads on the top side of the base carrier.

11. The stacked multichip package of claim 10, further comprising an encapsulant covering the first and second dice, the first and second wires, and at least a portion of the top side of the base carrier.

12. A stacked multichip package, comprising:

a base carrier having a top side and a bottom side, the top side including a plurality of first leads and a plurality of second leads;

a bottom integrated circuit die having a bottom surface attached to the base carrier top side, and an opposing, top surface, the top surface having a peripheral area including a plurality of first bonding pads and a central area, wherein the bottom die is electrically connected to the base carrier with first wires, the first wires having first ends electrically connected to the first bonding pads and second ends electrically connected to the first leads;

a bead formed on the top surface of the bottom die between the peripheral area and the central area;

an adhesive material formed in the central area on the top surface of the bottom die, the adhesive material being surrounded by the bead;

a top integrated circuit die having a bottom surface, wherein the top die is positioned over the bottom die and the bottom surface of the top die is attached to the top surface of the bottom die via the bead and the adhesive material, and the bead maintains a predetermined spacing between the bottom die and the top die, and wherein the top die includes a plurality of second bonding pads located in a peripheral area on a top surface thereof and wherein the top die is electrically connected to the base carrier with second wires, the second wires having first ends electrically connected to the second bonding pads and second ends electrically connected to the second leads; and

an encapsulant covering the first and second dice, the first and second wires, and at least a portion of the top side of the base carrier.

13. The stacked multichip package of claim 12, wherein the bottom die is attached to the base carrier with a first adhesive material layer.

14. The stacked multichip package of claim 13, wherein the top die and the bottom die are of similar size and shape.

15. The stacked multichip package of claim 13, wherein the top die is larger than the bottom die.

16. The stacked multichip package of claim 13, wherein the bead comprises epoxy.

17. The stacked multichip package of claim 16, wherein the adhesive material comprises epoxy.

18. The stacked multichip package of claim 13, wherein the predetermined spacing between the top die and the bottom die maintained by the bead is sufficient to protect the electrical connections between the first wires and the first bonding pads from being damaged by the attachment of the top die to the bottom die.

19. A method of making a stacked multichip package comprising the steps of:

attaching a bottom integrated circuit die to a base carrier, the bottom die having a top surface and a bottom surface, wherein the bottom surface is attached to a top side of the base carrier and wherein the bottom die top surface has a central area and a peripheral area, the peripheral area including a plurality of first bonding pads;

electrically connecting the bottom die to the base carrier by wirebonding first wires to the plurality of first bonding pads of the bottom die and to corresponding first leads on the top side of the base carrier;

forming a bead of adhesive material between the central area and the peripheral area on the top surface of the bottom die, wherein the bead has a predetermined height;

attaching a bottom surface of a top die to the top surface of the bottom die with the adhesive material bead, wherein the bead causes the top die to be spaced from the bottom die such that the top die does not contact the first wires; and

electrically connecting the top die to the base carrier by wirebonding second wires to second bonding pads located on a top surface of the top die and to corresponding second leads on the base carrier.

20. The method of making a stacked multichip package of claim 19, wherein the bottom and top dice have substantially the same length and substantially the same width.

21. The method of making a stacked multichip package of claim 19, wherein the top die is larger than the bottom die.

22. The method of making a stacked multichip package of claim 19, further comprising the step of filling the central area on the top surface of the bottom die with an adhesive material, wherein the adhesive material is surrounded by the bead and wherein the bead and the adhesive material secure the top die to the bottom die.

23. The method of making a stacked multichip package of claim 22, wherein the material used to form the bead has a higher viscosity than the adhesive material.

24. The method of making a stacked multichip package of claim 23, the bead and the adhesive material comprise epoxy.

25. The method of making a stacked multichip package of claim 19, further comprising the step of encapsulating the top and bottom dice, the first and second wires, and at least a portion of the base carrier with a resin.

26. A method of making a stacked multichip package comprising the steps of:

attaching a bottom integrated circuit die to a base carrier, the bottom die having a top surface and a bottom surface, wherein the bottom surface is attached to a top side of the base carrier and wherein the bottom die top surface has a central area and a peripheral area, the peripheral area including a plurality of first bonding pads;

electrically connecting the bottom die to the base carrier by wirebonding first wires to the plurality of first bonding pads of the bottom die and to corresponding first leads on the top side of the base carrier;

forming a bead of adhesive material between the central area and the peripheral area on the top surface of the bottom die, wherein the bead has a predetermined height;

filling the central area on the top surface of the bottom die with an adhesive material, wherein the adhesive material is surrounded by the bead;

attaching a bottom surface of a top die to the top surface of the bottom die, wherein the bead and the adhesive material secure the top die to the bottom die and wherein the bead causes the top die to be spaced from the bottom die such that the top die does not contact the first wires;

electrically connecting the top die to the base carrier by wirebonding second wires to second bonding pads located on a top surface of the top die and to corresponding second leads on the base carrier; and

encapsulating the top and bottom dice, the first and second wires, and at least a portion of the base carrier with a resin.

27. The method of making a stacked multichip package of claim 26, wherein the material used to form the bead has a higher viscosity than the adhesive material.

28. The method of making a stacked multichip package of claim 27, the bead and the adhesive material comprise epoxy.